

PATENT ABSTRACTS OF JAPAN

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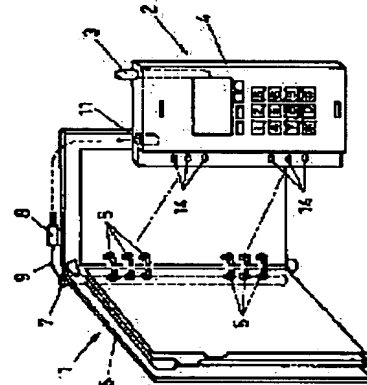
(54) PORTABLE RADIO COMMUNICATION EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To

provide superior carrying performance and communication characteristic with high sensitivity to a communication equipment.

SOLUTION: This radio communication equipment 2 is integrated with a notebook 1 by putting binding claws to binding holes 14 and closing the claws. In this state, when a coupling plug 8 is plugged into an antenna jack 11, a built-in antenna 3 is disconnected from a reception circuit in the radio communication equipment 2, and an external antenna 7 arranged on a cover front side of the notebook 1 is connected to the reception circuit. Thus, even if a user carries



the radio communication equipment 2 bound in the notebook 1 in a closed state, a signal is received with sensitivity higher than the case of using the built-in antenna 3. An antenna circuit at a transmission circuit side in the radio communication equipment 2 may be switched to the built-in antenna 3 or the external antenna 7 or the antenna circuit for the reception circuit and the transmission circuit may be both switched.

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CLAIMS**[Claim(s)]**

[Claim 1] While consisting of a notebook of a binding-head mold, and wireless radios with which the binding-head section for attaching in the binding-head member of said notebook was formed in the edge of a case while having the built-in antenna and arranging an external antenna in the covering front face of said notebook At the head of the antenna feeder which connects this external antenna and the communication circuit of said radiocommunication inside of a plane and by which one side of the connector which can fit in was connected to said external antenna, mutually Said built-in antenna is connected to the receiving circuit of said communication circuit until it uses another side as the case of said wireless radios and uses fitting of the connector by the side of said external antenna to the connector by the side of installation and this case, respectively. The pocket mold radio communication equipment characterized by establishing the connection antenna means for switching which will separate said built-in antenna from said receiving circuit, and will connect said external antenna to this receiving circuit if fitting of said connector of each other is carried out.

[Claim 2] While consisting of a notebook of a binding-head mold, and wireless radios with which the binding-head section for attaching in the binding-head member of said notebook was formed in the edge of a case while having the built-in antenna and arranging an external antenna in the covering front face of said notebook At the head of the antenna feeder which connects this external antenna and the communication circuit of said radiocommunication inside of a plane and by which one side of the connector which can fit in was connected to said external antenna, mutually Said built-in antenna is connected to the sending circuit of said communication circuit until it uses another side as the case of said wireless radios and uses fitting of the connector by the side of said external antenna to the connector by the side of installation and this case, respectively. The pocket mold radio

communication equipment characterized by establishing the connection antenna means for switching which will separate said built-in antenna from said sending circuit, and will connect said external antenna to this sending circuit if fitting of said connector of each other is carried out.

[Claim 3] While consisting of a notebook of a binding-head mold, and wireless radios with which the binding-head section for attaching in the binding-head member of said notebook was formed in the edge of a case while having the built-in antenna and arranging an external antenna in the covering front face of said notebook At the head of the antenna feeder which connects this external antenna and the communication circuit of said radiocommunication inside of a plane and by which one side of the connector which can fit in was connected to said external antenna, mutually The antenna common machine connected to both the sending circuits and receiving circuits of said communication circuit until it uses another side as the case of said wireless radios and used fitting of the connector by the side of said external antenna to the connector by the side of installation and this case, respectively is connected to a built-in antenna. The pocket mold radio communication equipment characterized by establishing the connection antenna means for switching which will separate said built-in antenna from said antenna common machine, and will connect said external antenna to this antenna common machine if fitting of said connector of each other is carried out.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the pocket mold radio communication equipment which can carry a cell phone unit etc.

[0002]

[Description of the Prior Art] There are some which were made convenient to carry in the cell phone unit which is a pocket mold radio communication equipment by forming the part which has a dial function, the part which built in the logical circuit of a telephone in the shape of a card as indicated by JP,4-117849.A. Since the cell phone unit of the shape of such a card is very a thin shape, it walks around with it in the condition of having inserted between notebooks, or where a cell phone unit is attached in a notebook using the part (coalesce condition), with the cell phone unit of the binding-head mold which can attach now the binding-head section of a cell phone unit (wireless radios) in the binding-head member beforehand prepared in the notebook, a user walks around with it in many cases.

[0003]

[Problem(s) to be Solved by the Invention] However, even if it is walking around with such a cell phone unit with the condition of having closed the notebook, without a user taking over the telephone, it is in the waiting receptacle condition for a communication link. In this condition, since location registration is always performed between distant offices (base station) using the built-in antenna built in the case etc. so that a cell phone unit may not become obstructive in the usual case, transmission and reception are always performed intermittently.

[0004] However, where a notebook is closed, since a built-in antenna will be covered with the notebook itself, such a cell phone unit had the trouble that receiving sensibility will worsen, when received field strength fell. Moreover, since the antenna power radiated in the air also declined compared with the

case where a cell phone unit is used independently, without making it coalesce in a notebook, it also had the trouble that a communication link might become impossible easily with a distant office (base station).

[0005] It aims at offering the pocket mold radio communication equipment which has the communication link nature of high sensibility, this invention being made in view of the above-mentioned trouble, and excelling in portability.

[0006]

[Means for Solving the Problem] In order that this invention may attain the above-mentioned object, it consists of a notebook of a binding-head mold, and wireless radios with which the binding-head section for attaching in the binding-head member of the above-mentioned notebook was formed in the edge of a case while having the built-in antenna. While arranging an external antenna in the covering front face of the above-mentioned notebook, mutually at the head of the antenna feeder which connects the external antenna and communication circuit of the radiocommunication inside of a plane and by which one side of the connector which can fit in was connected to the external antenna A built-in antenna is connected to the receiving circuit of the above-mentioned communication circuit until it uses another side as the case of wireless radios and uses fitting of the connector by the side of an external antenna to the connector by the side of installation and its case, respectively. If fitting of the connector of each other is carried out, the connection antenna means for switching which separates a built-in antenna from a receiving circuit, and connects an external antenna to the receiving circuit is established, and a pocket mold radio communication equipment is constituted.

[0007] If it does in this way, will attach wireless radios in a notebook by the binding-head member, and the binding-head section will be made to coalesce, if fitting of the connector of each other is carried out in the condition, a built-in antenna will be separated from the receiving circuit of the radiocommunication inside of a plane, and the external antenna currently arranged in the covering front face of a notebook will be connected to the receiving circuit. Therefore, where a notebook is closed, even if a user walks around with the wireless radios bound to the notebook, high sensitivity reception can be performed compared with the case where a built-in antenna is used.

[0008] Moreover, the connector of each other which can fit in is prepared between the antenna feeder connected to the external antenna, and the case of wireless radios like the above. A built-in antenna is connected to the sending circuit of the communication circuit of the radiocommunication inside of a plane until it carries out fitting of the connector by the side of an external antenna to the connector by the side of the case of wireless radios.

If fitting of the connector of each other is carried out, you may make it establish the connection antenna means for switching which separates a built-in antenna from a sending circuit, and connects an external antenna to the sending circuit.

[0009] If fitting of the connector of each other is carried out in the condition of having made wireless radios coalescing in a notebook when doing in this way, a built-in antenna will be separated from the sending circuit of the radiocommunication inside of a plane, and the external antenna currently arranged in the covering front face of a notebook will be connected to the sending circuit. Therefore, since the antenna power emitted in the air compared with the case where a built-in antenna is used increases even if a user walks around with the wireless radios bound to the notebook, where a notebook is closed, communication link nature with a good distant office is obtained.

[0010] Furthermore, the connector of each other which can fit in is prepared between the antenna feeder connected to the external antenna, and the case of wireless radios like the above. The antenna common machine connected to both the sending circuits and receiving circuits of a communication circuit until it carried out fitting of the connector by the side of an external antenna to the connector by the side of the case is connected to a built-in antenna. If fitting of the above-mentioned connector of each other is carried out, the connection antenna means for switching which separates a built-in antenna from an antenna common machine, and connects an external antenna to the antenna common machine is established, and you may make it constitute a pocket mold radio communication equipment.

[0011] If fitting of the connector of each other is carried out in the condition of having made wireless radios coalescing in a notebook when doing in this way, a built-in antenna will be separated from the antenna common machine of the radiocommunication inside of a plane, and the external antenna currently arranged in the covering front face of a notebook will be connected to the antenna common machine. Therefore, where a notebook is closed, even if a user walks around with the wireless radios bound to the notebook, while being able to perform high sensitivity reception compared with the case where a built-in antenna is used, a good communication link can do a distant office.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained based on a drawing. The appearance perspective view showing the binding-head mold notebook equipped with the wireless radios whose drawing 1 is a pocket mold radio communication equipment by this invention, the circuit diagram of the binding-head mold notebook in

which drawing 2 was similarly equipped with those wireless radios, the schematic diagram showing the external antenna-coupler-control plug inserted in the external antenna jack by which drawing 3 is similarly prepared in those wireless radios, and there, and drawing 4 are the schematic diagrams showing the condition that the external antenna-coupler-control plug was similarly inserted in that external antenna jack.

[0013] The binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments shown in drawing 1 becomes the edge of a case 4 from the wireless radios 2 which are the cellular-phone machines with which two or more formation of the binding hole 14 used as the binding-head section for attaching in two or more binding-head pawls 5 which are the binding-head members of a notebook 1 was carried out while being equipped with the notebook 1 and the built-in antenna 3 of a binding-head mold.

[0014] And if each binding-head pawl 5 is closed as it changes into the condition of having opened the binding-head pawl 5 altogether and each of that binding-head pawl 5 is made to insert in the binding hole 14, respectively when attaching the wireless radios 2 in a notebook 1, wireless radios 2 can be attached easily [a notebook 1], and they can be made to coalesce.

[0015] The external antenna 7 is fixed to the bending location located in the center of abbreviation on the front face 6 of covering of a notebook 1 along with the bend line. And the external antenna-coupler-control plug 8 (it is only hereafter called the joint plug 8) which connects the external antenna 7 and the communication circuit 10 (it mentions later by drawing 2) which is a RF circuit in wireless radios 2 and which serves as one side of the connector which can fit in mutually is attached at the head of the antenna feeder (output line) 9 connected to the external antenna 7.

[0016] Moreover, the external antenna jack 11 (it is only hereafter called the antenna jack 11) used as another side of the connector is attached in the case 4 of wireless radios 2. And it connects with the contact c by which the contact b connected to the built-in antenna 3 through the antenna common machine 15 as a continuous line showed to drawing 2 until it is having switch structure as the antenna jack 11 shows to drawing 3 R> 3 with the gestalt of this operation, as for this antenna jack 11, the joint plug 8 is inserted there and fitting is carried out was connected to the receiving circuit 12 of a communication circuit 10 (short circuit). Under the present circumstances, Contact a and Contact c are in an open condition.

[0017] Moreover, if fitting of the joint plug 8 is inserted and carried out to this antenna jack 11 as shown in drawing 4 , as an imaginary line shows to drawing 2 , the contact b connected to the built-in antenna 3 will be separated from Contact c, and the contact a connected to the external antenna 7 will be connected to that contact c. Under the present

circumstances, Contact b and Contact c will be in an open condition (also see drawing 4). Thus, although the antenna jack 11 of the switch structure which serves as a connection antenna means for switching to a case 4 was formed with the gestalt of this operation in order to lessen components mark, you may make it establish this connection antenna means for switching apart from an antenna jack. In that case, an antenna jack is good at the jack of a simple configuration which does not have switch structure.

[0018] Moreover, the communication circuit 10 of wireless radios 2 is equipped also with the sending circuit 16, and the sending circuit 16 is connected to the built-in antenna 3 through the antenna common machine (the antenna switch which achieves the same function may be used) 15. And this sending circuit 16 and receiving circuit 12 are controlled by both the control circuits 20.

[0019] Attach the binding-head mold notebook equipped with these wireless radios by inserting in the binding-head pawl 5 of a notebook 1 the binding hole 14 currently formed in the edge of a case 4 in the wireless radios 2 shown in drawing 1 , and it is made to coalesce in a notebook 1. If the joint plug 8 is inserted in the antenna jack 11 and each other carries out fitting in the condition, the built-in antenna 3 will be separated from a receiving circuit 12 by separating the contact b of the switch in the antenna jack 11 from Contact c, as the imaginary line showed to drawing 2 .

[0020] Moreover, since Contact a is connected to Contact c, the external antenna 7 currently arranged in the covering front face 6 of a notebook 1 is connected to a receiving circuit 12. Therefore, the antenna of a receiving system circuit switches from the built-in antenna 3 to the external antenna 7 of high sensitivity. In addition, it is still the circuit where the antenna circuit of a transmitting system uses the built-in antenna 3 in this case.

[0021] Since reception will be performed by the external antenna 7 if the joint plug 8 is inserted in the antenna jack 11 even if a user carries around, where that notebook 1 is closed, compared with the case where it receives using the built-in antenna 3, high sensitivity reception can do the wireless radios 2 which were bound to the notebook 1 according to the binding-head mold notebook equipped with these wireless radios.

[0022] Drawing 5 is the same circuit diagram as drawing 2 which shows the gestalt of other operations of the binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments by this invention, and has given the same sign to drawing 2 and a corresponding part. Only the points which are not receiving-circuit 12 sides and arranged in the sending-circuit 16 side the connector which consists of a joint plug 8 (refer to drawing 1) and an antenna jack 11 differ to the gestalt of the operation which explained the binding-head mold notebook equipped with these wireless radios by drawing 2 .

[0023] If the joint plug 8 is inserted in the antenna jack 11 in the condition of having made wireless-radios 2' coalescing in a notebook (seeing the notebook 1 of drawing 1) like [if it does in this way] the gestalt of operation mentioned above and fitting of them is carried out mutually. Since the contact c in the antenna jack 11 is separated from Contact b and Contact a is contacted as a continuous line shows from the location shown in drawing 5 by the imaginary line, the antenna of a transmitting system circuit switches from the built-in antenna 3 to the external antenna 7. In addition, it is still the circuit where the antenna circuit of a receiving system uses the built-in antenna 3 in this case.

[0024] Since transmission will be performed by the external antenna 7 if the joint plug 8 is inserted in the antenna jack 11 even if a user walks around with wireless-radios 2' bound to the notebook according to the binding-head mold notebook equipped with these wireless radios, where a notebook is closed and the antenna power emitted in the air compared with the case where the built-in antenna 3 is used increases, communication link nature with a good distant office is obtained.

[0025] Drawing 6 is the same circuit diagram as drawing 2 of the binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments by this invention which shows the gestalt of other operations further, and has given the same sign to drawing 2 and a corresponding part. It differs in that the arrangement location of the antenna jack 11 was changed to the gestalt of each operation which explained the binding-head mold notebook equipped with these wireless radios by drawing 2 and drawing 5 .

[0026] That is, when the contact c in the antenna jack 11 is connected to Contact b as a continuous line shows to drawing 6 until it forms the antenna jack 11 in the case 4 of 2" of wireless radios and the joint plug 8 (drawing 1) fits into the antenna jack 11, the joint plug 8 is inserted in the antenna jack 11 and fitting is carried out mutually, as an imaginary line shows to this drawing, Contact c separates from Contact b, and he is trying to connect with Contact a.

[0027] Therefore, although the built-in antenna 3 is connected to the antenna common machine 15 connected to both the sending circuits 16 and receiving circuits 12 of a communication circuit 10 until it carries out fitting of the plug 8 to the antenna jack 11. If a plug 8 is inserted in the antenna jack 11 and fitting of them is carried out mutually, the built-in antenna 3 will be separated from the antenna common machine 15, and the external antenna 7 will come to be connected to the antenna common machine 15.

[0028] Therefore, since transmission and reception will be performed by the external antenna 7 if the joint plug 8 is inserted in the antenna jack 11 even if a user walks around with 2" of wireless radios bound to the notebook,

where a notebook is closed, while being able to perform high sensitivity reception compared with the case where the built-in antenna 3 is used, communication link nature with a good distant office is obtained. As mentioned above, although the gestalt of each operation which applied this invention to the binding-head mold notebook equipped with wireless radios was explained, this invention is applicable like portable mold (pocket mold) information communication equipment, portable mold electronic equipment, etc. in addition to it.

[0029]

[Effect of the Invention] Since an antenna will switch from a built-in antenna to an external antenna if it is excellent in portability, makes another side carry out fitting of one side of a connector and is connected, since the pocket mold radio communication equipment by this invention can carry wireless radios easily and can carry out them in the condition of having bound to the notebook as explained above, the communication link nature of high sensibility is obtained.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the pocket mold radio communication equipment which can carry a cell phone unit etc.

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PRIOR ART

[Description of the Prior Art] There are some which were made convenient to carry in the cell phone unit which is a pocket mold radio communication equipment by forming the part which has a dial function, the part which built in the logical circuit of a telephone in the shape of a card as indicated by JP,4-117849,A. Since the cell phone unit of the shape of such a card is very a thin shape, it walks around with it in the condition of having inserted between notebooks, or where a cell phone unit is attached in a notebook using the part (coalesce condition), with the cell phone unit of the binding-head mold which can attach now the binding-head section of a cell phone unit (wireless radios) in the binding-head member beforehand prepared in the notebook, a user walks around with it in many cases.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since an antenna will switch from a built-in antenna to an external antenna if it is excellent in portability, makes another side carry out fitting of one side of a connector and is connected, since the pocket mold radio communication equipment by this invention can carry wireless radios easily and can carry out them in the condition of having bound to the notebook as explained above, the communication link nature of high sensibility is obtained.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, even if it is walking around with such a cell phone unit with the condition of having closed the notebook, without a user talking over the telephone, it is in the waiting receptacle condition for a communication link. In this condition, since location registration is always performed between distant offices (base station) using the built-in antenna built in the case etc. so that a cell phone unit may not become obstructive in the usual case, transmission and reception are always performed intermittently.

[0004] However, where a notebook is closed, since a built-in antenna will be covered with the notebook itself, such a cell phone unit had the trouble that receiving sensibility will worsen, when received field strength fell. Moreover, since the antenna power radiated in the air also declined compared with the case where a cell phone unit is used independently, without making it coalesce in a notebook, it also had the trouble that a communication link might become impossible easily with a distant office (base station).

[0005] It aims at offering the pocket mold radio communication equipment which has the communication link nature of high sensibility, this invention being made in view of the above-mentioned trouble, and excelling in portability.

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MEANS

[Means for Solving the Problem] In order that this invention may attain the above-mentioned object, it consists of a notebook of a binding-head mold, and wireless radios with which the binding-head section for attaching in the binding-head member of the above-mentioned notebook was formed in the edge of a case while having the built-in antenna. While arranging an external antenna in the covering front face of the above-mentioned notebook, mutually at the head of the antenna feeder which connects the external antenna and communication circuit of the radiocommunication inside of a plane and by which one side of the connector which can fit in was connected to the external antenna A built-in antenna is connected to the receiving circuit of the above-mentioned communication circuit until it uses another side as the case of wireless radios and uses fitting of the connector by the side of an external antenna to the connector by the side of installation and its case, respectively. If fitting of the connector of each other is carried out, the connection antenna means for switching which separates a built-in antenna from a receiving circuit, and connects an external antenna to the receiving circuit is established, and a pocket mold radio communication equipment is constituted.

[0007] If it does in this way, will attach wireless radios in a notebook by the binding-head member, and the binding-head section will be made to coalesce, if fitting of the connector of each other is carried out in the condition, a built-in antenna will be separated from the receiving circuit of the radiocommunication inside of a plane, and the external antenna currently arranged in the covering front face of a notebook will be connected to the receiving circuit. Therefore, where a notebook is closed, even if a user walks around with the wireless radios bound to the notebook, high sensitivity reception can be performed compared with the case where a built-in antenna is used.

[0008] Moreover, the connector of each other which can fit in is prepared

between the antenna feeder connected to the external antenna, and the case of wireless radios like the above. A built-in antenna is connected to the sending circuit of the communication circuit of the radiocommunication inside of a plane until it carries out fitting of the connector by the side of an external antenna to the connector by the side of the case of wireless radios. If fitting of the connector of each other is carried out, you may make it establish the connection antenna means for switching which separates a built-in antenna from a sending circuit, and connects an external antenna to the sending circuit.

[0009] If fitting of the connector of each other is carried out in the condition of having made wireless radios coalescing in a notebook when doing in this way, a built-in antenna will be separated from the sending circuit of the radiocommunication inside of a plane, and the external antenna currently arranged in the covering front face of a notebook will be connected to the sending circuit. Therefore, since the antenna power emitted in the air compared with the case where a built-in antenna is used increases even if a user walks around with the wireless radios bound to the notebook, where a notebook is closed, communication link nature with a good distant office is obtained.

[0010] Furthermore, the connector of each other which can fit in is prepared between the antenna feeder connected to the external antenna, and the case of wireless radios like the above. The antenna common machine connected to both the sending circuits and receiving circuits of a communication circuit until it carried out fitting of the connector by the side of an external antenna to the connector by the side of the case is connected to a built-in antenna. If fitting of the above-mentioned connector of each other is carried out, the connection antenna means for switching which separates a built-in antenna from an antenna common machine, and connects an external antenna to the antenna common machine is established, and you may make it constitute a pocket mold radio communication equipment.

[0011] If fitting of the connector of each other is carried out in the condition of having made wireless radios coalescing in a notebook when doing in this way, a built-in antenna will be separated from the antenna common machine of the radiocommunication inside of a plane, and the external antenna currently arranged in the covering front face of a notebook will be connected to the antenna common machine. Therefore, where a notebook is closed, even if a user walks around with the wireless radios bound to the notebook, while being able to perform high sensitivity reception compared with the case where a built-in antenna is used, a good communication link can do a distant office.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained based on a drawing. The appearance perspective view showing the binding-head mold notebook equipped with the wireless radios whose drawing 1 is a pocket mold radio communication equipment by this invention, the circuit diagram of the binding-head mold notebook in which drawing 2 was similarly equipped with those wireless radios, the schematic diagram showing the external antenna-coupler-control plug inserted in the external antenna jack by which drawing 3 is similarly prepared in those wireless radios, and there, and drawing 4 are the schematic diagrams showing the condition that the external antenna-coupler-control plug was similarly inserted in that external antenna jack.

[0013] The binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments shown in drawing 1 becomes the edge of a case 4 from the wireless radios 2 which are the cellular-phone machines with which two or more formation of the binding hole 14 used as the binding-head section for attaching in two or more binding-head pawls 5 which are the binding-head members of a notebook 1 was carried out while being equipped with the notebook 1 and the built-in antenna 3 of a binding-head mold.

[0014] And if each binding-head pawl 5 is closed as it changes into the condition of having opened the binding-head pawl 5 altogether and each of that binding-head pawl 5 is made to insert in the binding hole 14, respectively when attaching the wireless radios 2 in a notebook 1, wireless radios 2 can be attached easily [a notebook 1], and they can be made to coalesce.

[0015] The external antenna 7 is fixed to the bending location located in the center of abbreviation on the front face 6 of covering of a notebook 1 along with the bend line. And the external antenna-coupler-control plug 8 (it is only hereafter called the joint plug 8) which connects the external antenna 7 and the communication circuit 10 (it mentions later by drawing 2) which is a RF circuit in wireless radios 2 and which serves as one side of the connector which can fit in mutually is attached at the head of the antenna feeder (output line) 9 connected to the external antenna 7.

[0016] Moreover, the external antenna jack 11 (it is only hereafter called the antenna jack 11) used as another side of the connector is attached in the case 4 of wireless radios 2. And it connects with the contact c by which the contact b connected to the built-in antenna 3 through the antenna common machine 15 as a continuous line showed to drawing 2 until it is having switch structure as the antenna jack 11 shows to drawing 3 R> 3 with the gestalt of this operation, as for this antenna jack 11, the joint plug 8 is inserted there and fitting is carried out was connected to the receiving circuit 12 of a communication circuit 10 (short circuit). Under the present circumstances, Contact a and Contact c are in an open condition.

[0017] Moreover, if fitting of the joint plug 8 is inserted and carried out to this antenna jack 11 as shown in drawing 4 , as an imaginary line shows to drawing 2 , the contact b connected to the built-in antenna 3 will be separated from Contact c, and the contact a connected to the external antenna 7 will be connected to that contact c. Under the present circumstances, Contact b and Contact c will be in an open condition (also see drawing 4). Thus, although the antenna jack 11 of the switch structure which serves as a connection antenna means for switching to a case 4 was formed with the gestalt of this operation in order to lessen components mark, you may make it establish this connection antenna means for switching apart from an antenna jack. In that case, an antenna jack is good at the jack of a simple configuration which does not have switch structure.

[0018] Moreover, the communication circuit 10 of wireless radios 2 is equipped also with the sending circuit 16, and the sending circuit 16 is connected to the built-in antenna 3 through the antenna common machine (the antenna switch which achieves the same function may be used) 15. And this sending circuit 16 and receiving circuit 12 are controlled by both the control circuits 20.

[0019] Attach the binding-head mold notebook equipped with these wireless radios by inserting in the binding-head pawl 5 of a notebook 1 the binding hole 14 currently formed in the edge of a case 4 in the wireless radios 2 shown in drawing 1 , and it is made to coalesce in a notebook 1. If the joint plug 8 is inserted in the antenna jack 11 and each other carries out fitting in the condition, the built-in antenna 3 will be separated from a receiving circuit 12 by separating the contact b of the switch in the antenna jack 11 from Contact c, as the imaginary line showed to drawing 2 .

[0020] Moreover, since Contact a is connected to Contact c, the external antenna 7 currently arranged in the covering front face 6 of a notebook 1 is connected to a receiving circuit 12. Therefore, the antenna of a receiving system circuit switches from the built-in antenna 3 to the external antenna 7 of high sensitivity. In addition, it is still the circuit where the antenna circuit of a transmitting system uses the built-in antenna 3 in this case.

[0021] Since reception will be performed by the external antenna 7 if the joint plug 8 is inserted in the antenna jack 11 even if a user carries around, where that notebook 1 is closed, compared with the case where it receives using the built-in antenna 3, high sensitivity reception can do the wireless radios 2 which were bound to the notebook 1 according to the binding-head mold notebook equipped with these wireless radios.

[0022] Drawing 5 is the same circuit diagram as drawing 2 which shows the gestalt of other operations of the binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments by this invention, and has given the same sign to drawing 2 and a

corresponding part. Only the points which are not receiving-circuit 12 sides and arranged in the sending-circuit 16 side the connector which consists of a joint plug 8 (refer to drawing 1) and an antenna jack 11 differ to the gestalt of the operation which explained the binding-head mold notebook equipped with these wireless radios by drawing 2.

[0023] If the joint plug 8 is inserted in the antenna jack 11 in the condition of having made wireless-radios 2' coalescing in a notebook (seeing the notebook 1 of drawing 1) like [if it does in this way] the gestalt of operation mentioned above and fitting of them is carried out mutually. Since the contact c in the antenna jack 11 is separated from Contact b and Contact a is contacted as a continuous line shows from the location shown in drawing 5 by the imaginary line, the antenna of a transmitting system circuit switches from the built-in antenna 3 to the external antenna 7. In addition, it is still the circuit where the antenna circuit of a receiving system uses the built-in antenna 3 in this case.

[0024] Since transmission will be performed by the external antenna 7 if the joint plug 8 is inserted in the antenna jack 11 even if a user walks around with wireless-radios 2' bound to the notebook according to the binding-head mold notebook equipped with these wireless radios, where a notebook is closed and the antenna power emitted in the air compared with the case where the built-in antenna 3 is used increases, communication link nature with a good distant office is obtained.

[0025] Drawing 6 is the same circuit diagram as drawing 2 of the binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments by this invention which shows the gestalt of other operations further, and has given the same sign to drawing 2 and a corresponding part. It differs in that the arrangement location of the antenna jack 11 was changed to the gestalt of each operation which explained the binding-head mold notebook equipped with these wireless radios by drawing 2 and drawing 5.

[0026] That is, when the contact c in the antenna jack 11 is connected to Contact b as a continuous line shows to drawing 6 until it forms the antenna jack 11 in the case 4 of 2" of wireless radios and the joint plug 8 (drawing 1) fits into the antenna jack 11, the joint plug 8 is inserted in the antenna jack 11 and fitting is carried out mutually, as an imaginary line shows to this drawing, Contact c separates from Contact b, and he is trying to connect with Contact a.

[0027] Therefore, although the built-in antenna 3 is connected to the antenna common machine 15 connected to both the sending circuits 16 and receiving circuits 12 of a communication circuit 10 until it carries out fitting of the plug 8 to the antenna jack 11. If a plug 8 is inserted in the antenna jack 11 and fitting of them is carried out mutually, the built-in antenna 3 will be

separated from the antenna common machine 15, and the external antenna 7 will come to be connected to the antenna common machine 15.

[0028] Therefore, since transmission and reception will be performed by the external antenna 7 if the joint plug 8 is inserted in the antenna jack 11 even if a user walks around with 2" of wireless radios bound to the notebook, where a notebook is closed, while being able to perform high sensitivity reception compared with the case where the built-in antenna 3 is used, communication link nature with a good distant office is obtained. As mentioned above, although the gestalt of each operation which applied this invention to the binding-head mold notebook equipped with wireless radios was explained, this invention is applicable like portable mold (pocket mold) information communication equipment, portable mold electronic equipment, etc. in addition to it.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the appearance perspective view showing the binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments by this invention.

[Drawing 2] It is the circuit diagram of the binding-head mold notebook similarly equipped with the wireless radios.

[Drawing 3] It is the schematic diagram showing the external antenna-coupler-control plug inserted in the external antenna jack similarly prepared in the wireless radios, and there.

[Drawing 4] It is the schematic diagram showing the condition that the external antenna-coupler-control plug was similarly inserted in the external antenna jack.

[Drawing 5] It is the same circuit diagram as drawing 2 which shows the gestalt of other operations of the binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments by this invention.

[Drawing 6] It is the same circuit diagram as drawing 2 of the binding-head mold notebook equipped with the wireless radios which are the pocket mold radio communication equipments by this invention which shows the gestalt of other operations further.

[Description of Notations]

- 1: Notebook 2, 2', 2'': Wireless radios
- 3: Built-in antenna 4: Case
- 5: Binding-head pawl (binding-head member)
- 6: Covering front face 7: External antenna
- 8: External antenna-coupler-control plug (connector)
- 10: Communication circuit
- 11: External antenna jack (connector)
- 12: Receiving circuit

- 14: Binding hole (binding-head section)
- 15: Antenna common machine 16: Sending circuit

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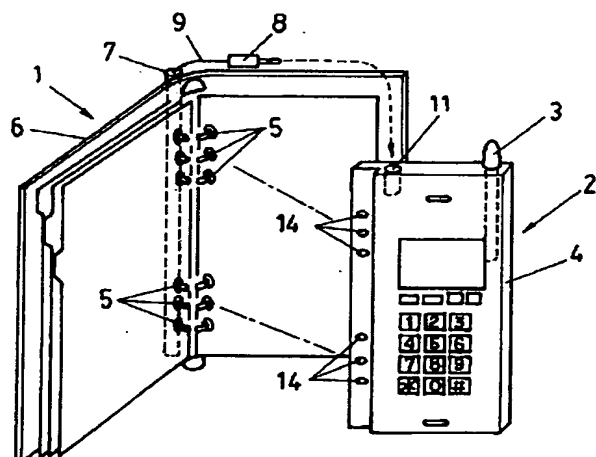
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(54) 【発明の名称】 携帯型無線通信装置

(57) 【要約】

【課題】 携帯性に優れ、高い感度の通信性を有するようになる。

【解決手段】 無線通信機2を手帳1に、バイディング孔14にバインド爪5を入れて閉じることによって合体させ、その状態で結合プラグ8をアンテナジャック11に差し込めば、内蔵アンテナ3が無線通信機2内の受信回路から切り離されて、その受信回路には手帳1のカバー表面6に配設されている外部アンテナ7が接続される。したがって、その手帳1にバインドされた無線通信機2を、利用者が手帳1を閉じた状態で持ち歩いても、内蔵アンテナ3を用いた場合に比べて高感度な受信ができる。また、無線通信機2内の送信回路側のアンテナ回路を内蔵アンテナ3と外部アンテナ7とに切り換えるようにしてもよいし、受信回路と送信回路のアンテナ回路を共に切り換えるようにしてもよい。



【特許請求の範囲】

【請求項 1】 バインド型の手帳と、内蔵アンテナを備え、と共に筐体の端部には前記手帳のバインド部材に取り付けるためのバインド部が形成された無線通信機とからなり、前記手帳のカバー表面に外部アンテナを配設すると共に、該外部アンテナと前記無線通信機内の通信回路とを接続する互いに嵌合可能なコネクタの一方を前記外部アンテナに接続されたアンテナ給電線の先端に、他方を前記無線通信機の筐体にそれぞれ取り付け、該筐体側のコネクタに前記外部アンテナ側のコネクタを嵌合させるまでは前記内蔵アンテナを前記通信回路の受信回路に接続し、前記コネクタを互いに嵌合させると前記内蔵アンテナを前記受信回路から切り離して該受信回路に前記外部アンテナを接続する接続アンテナ切換手段を設けたことを特徴とする携帯型無線通信装置。

【請求項 2】 バインド型の手帳と、内蔵アンテナを備え、と共に筐体の端部には前記手帳のバインド部材に取り付けるためのバインド部が形成された無線通信機とからなり、前記手帳のカバー表面に外部アンテナを配設すると共に、該外部アンテナと前記無線通信機内の通信回路とを接続する互いに嵌合可能なコネクタの一方を前記外部アンテナに接続されたアンテナ給電線の先端に、他方を前記無線通信機の筐体にそれぞれ取り付け、該筐体側のコネクタに前記外部アンテナ側のコネクタを嵌合させるまでは前記内蔵アンテナを前記通信回路の送信回路に接続し、前記コネクタを互いに嵌合させると前記内蔵アンテナを前記送信回路から切り離して該送信回路に前記外部アンテナを接続する接続アンテナ切換手段を設けたことを特徴とする携帯型無線通信装置。

【請求項 3】 バインド型の手帳と、内蔵アンテナを備え、と共に筐体の端部には前記手帳のバインド部材に取り付けるためのバインド部が形成された無線通信機とからなり、前記手帳のカバー表面に外部アンテナを配設すると共に、該外部アンテナと前記無線通信機内の通信回路とを接続する互いに嵌合可能なコネクタの一方を前記外部アンテナに接続されたアンテナ給電線の先端に、他方を前記無線通信機の筐体にそれぞれ取り付け、該筐体側のコネクタに前記外部アンテナ側のコネクタを嵌合させるまでは前記通信回路の送信回路と受信回路とに共に接続されたアンテナ共用器を内蔵アンテナに接続し、前記コネクタを互いに嵌合させると前記内蔵アンテナを前記アンテナ共用器から切り離して該アンテナ共用器に前記外部アンテナを接続する接続アンテナ切換手段を設けたことを特徴とする携帯型無線通信装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 この発明は、携帯電話装置等の持ち運びが可能な携帯型無線通信装置に関する。

【0002】

【従来の技術】 携帯型無線通信装置である携帯電話装置

には、例えば特開平 4-117849 号公報に記載されているように、ダイヤル機能を有する部分や、電話のロジック回路を内蔵した部分等をカード状に形成することにより、携帯に便利にしたものがある。このようなカード状の携帯電話装置は、非常に薄型であるため、それを手帳の間に挟んだ状態で持ち歩いたり、あるいは予め手帳に設けられているバインド部材に携帯電話装置（無線通信機）のバインド部を取り付けることができるようになっていないバインド型の携帯電話装置では、その部分を使用して携帯電話装置を手帳に取り付けた状態（合体状態）で利用者が持ち歩くことが多い。

【0003】

【発明が解決しようとする課題】 しかしながら、このような携帯電話装置は、利用者が通話をせずに手帳を閉じた状態のまま持ち歩いても通信待ち受け状態になっている。この状態では、携帯電話装置は通常の場合において邪魔にならないように筐体等に内蔵されている内蔵アンテナを使用して相手局（基地局）との間で位置登録を常に行なっているため、常に間欠的に送信及び受信が行なわれている。

【0004】 ところが、このような携帯電話装置は手帳を閉じた状態では、内蔵アンテナが手帳そのものに覆われてしまうため、受信電界強度が低下してしまうことにより受信感度が悪くなってしまうという問題点があった。また、空中に輻射される空中線電力も、携帯電話装置を手帳に合体させずに単独で用いた場合に比べて低下してしまうので、相手局（基地局）と通信ができにくくなってしまうことがあるという問題点もあった。

【0005】 この発明は上記の問題点を鑑みてなされたものであり、携帯性に優れながら、高い感度の通信性を有する携帯型無線通信装置を提供することを目的とする。

【0006】

【課題を解決するための手段】 この発明は上記の目的を達成するため、バインド型の手帳と、内蔵アンテナを備え、と共に筐体の端部には上記手帳のバインド部材に取り付けるためのバインド部が形成された無線通信機とからなり、上記手帳のカバー表面に外部アンテナを配設すると共に、その外部アンテナと無線通信機内の通信回路とを接続する互いに嵌合可能なコネクタの一方を外部アンテナに接続されたアンテナ給電線の先端に、他方を無線通信機の筐体にそれぞれ取り付け、その筐体側のコネクタに外部アンテナ側のコネクタを嵌合させるまでは内蔵アンテナを上記通信回路の受信回路に接続し、そのコネクタを互いに嵌合させると内蔵アンテナを受信回路から切り離してその受信回路に外部アンテナを接続する接続アンテナ切換手段を設けて携帯型無線通信装置を構成したものである。

【0007】 このようにすれば、無線通信機を手帳にバインド部をバインド部材により取り付けて合体させ、そ

の状態のコネクタを互いに嵌合させれば、内蔵アンテナが無線通信機内の受信回路から切り離されて、その受信回路には手帳のカバー表面に配設されている外部アンテナが接続される。したがって、その手帳にバインドされた無線通信機を、利用者が手帳を閉じた状態で持ち歩いても、内蔵アンテナを用いた場合に比べて高感度な受信ができる。

【0008】また、上記と同様に互いに嵌合可能なコネクタを、外部アンテナに接続されたアンテナ給電線と無線通信機の筐体との間に設け、無線通信機の筐体側のコネクタに外部アンテナ側のコネクタを嵌合させるまでは内蔵アンテナを無線通信機内の通信回路の送信回路に接続し、コネクタを互いに嵌合させると内蔵アンテナを送信回路から切り離してその送信回路に外部アンテナを接続する接続アンテナ切換手段を設けるようにしてもよい。

【0009】このようにすれば、無線通信機を手帳に合体させた状態でコネクタを互いに嵌合させれば、内蔵アンテナが無線通信機内の送信回路から切り離されて、その送信回路には手帳のカバー表面に配設されている外部アンテナが接続される。したがって、その手帳にバインドされた無線通信機を、利用者が手帳を閉じた状態で持ち歩いても、内蔵アンテナを用いた場合に比べて空中に放出される空中線電力が増大するため、良好な相手局との通信性が得られる。

【0010】さらに、上記と同様に互いに嵌合可能なコネクタを、外部アンテナに接続されたアンテナ給電線と無線通信機の筐体との間に設け、その筐体側のコネクタに外部アンテナ側のコネクタを嵌合させるまでは通信回路の送信回路と受信回路とに共に接続されたアンテナ共用器を内蔵アンテナに接続し、上記コネクタを互いに嵌合させると内蔵アンテナをアンテナ共用器から切り離してそのアンテナ共用器に外部アンテナを接続する接続アンテナ切換手段を設けて携帯型無線通信装置を構成するようにしてもよい。

【0011】このようにすれば、無線通信機を手帳に合体させた状態でコネクタを互いに嵌合させれば、内蔵アンテナが無線通信機内のアンテナ共用器から切り離されて、そのアンテナ共用器には手帳のカバー表面に配設されている外部アンテナが接続される。したがって、その手帳にバインドされた無線通信機を、利用者が手帳を閉じた状態で持ち歩いても、内蔵アンテナを用いた場合に比べて高感度な受信ができると共に、相手局とも良好な通信ができる。

【0012】

【発明の実施の形態】以下、この発明の実施の形態を図面に基いて説明する。図1はこの発明による携帯型無線通信装置である無線通信機を備えたバインド型手帳を示す外観斜視図、図2は同じくその無線通信機を備えたバインド型手帳の回路図、図3は同じくその無線通信機

に設けられている外部アンテナジャックとそこに差し込まれる外部アンテナ結合プラグを示す概略図、図4は同じくその外部アンテナジャックに外部アンテナ結合プラグが差し込まれた状態を示す概略図である。

【0013】図1に示す携帯型無線通信装置である無線通信機を備えたバインド型手帳は、バインド型の手帳1と、内蔵アンテナ3を備えると共に筐体4の端部には手帳1のバインド部材である複数のバインド爪5に取り付けるためのバインド部となるバインディング孔14が複数形成された携帯電話器である無線通信機2とからなる。

【0014】そして、その無線通信機2を手帳1に取り付けるときには、バインド爪5を全て開いた状態にして、その各バインド爪5をバインディング孔14にそれぞれ嵌入させるようにして各バインド爪5を閉じれば、無線通信機2を手帳1に簡単に取り付けてそれらを合体させることができる。

【0015】手帳1のカバー表面6の略中央に位置する折り曲げ位置には、その折り曲げ線に沿って外部アンテナ7を固定している。そして、その外部アンテナ7と無線通信機2内の高周波回路である通信回路10（図2で後述する）とを接続する互いに嵌合可能なコネクタの一方となる外部アンテナ結合プラグ8（以下、単に結合プラグ8と呼ぶ）を、外部アンテナ7に接続されたアンテナ給電線（出力線）9の先端に取り付けている。

【0016】また、そのコネクタの他方となる外部アンテナジャック11（以下、単にアンテナジャック11と呼ぶ）を、無線通信機2の筐体4に取り付けている。そして、この実施の形態では、アンテナジャック11が図3に示すようなスイッチ構造をしており、このアンテナジャック11は、そこに結合プラグ8が差し込まれて嵌合されるまでは、図2に実線で示すように内蔵アンテナ3にアンテナ共用器15を介して接続された接点bを通信回路10の受信回路12に接続された接点cに接続（短絡）する。この際、接点aと接点cとは開放状態にある。

【0017】また、このアンテナジャック11に、図4に示すように結合プラグ8が差し込まれて嵌合されると、図2に仮想線で示すように内蔵アンテナ3に接続されている接点bを接点cから切り離して、その接点cに外部アンテナ7に接続された接点aを接続する。この際、接点bと接点cとは開放状態になる（図4も参照）。このように、この実施の形態では、部品点数を少なくするため筐体4に接続アンテナ切換手段を兼ねるスイッチ構造のアンテナジャック11を設けるようにしたが、この接続アンテナ切換手段はアンテナジャックと別に設けるようにしてもよい。その場合、アンテナジャックはスイッチ構造を有さない単純な形状のジャックでよい。

【0018】また、無線通信機2の通信回路10は送信

回路16も備えており、その送信回路16はアンテナ共用器（同様な機能を果たすアンテナスイッチでもよい）15を介して内蔵アンテナ3に接続されている。そして、この送信回路16と受信回路12とが、制御回路20により共に制御されるようになっている。

【0019】この無線通信機を備えたバインド型手帳は、図1に示した無線通信機2を筐体4の端部に形成されているバインディング孔14を手帳1のバインド爪5に差し込むことによって取り付けて手帳1と合体させ、その状態で結合プラグ8をアンテナジャック11に差し込んで互いに嵌合させると、図2に仮想線で示したようにアンテナジャック11内のスイッチの接点bが接点cから切り離されることにより、内蔵アンテナ3が受信回路12から切り離される。

【0020】また、接点aが接点cに接続されるため、手帳1のカバー表面6に配設されている外部アンテナ7が受信回路12に接続される。したがって、受信系回路のアンテナが内蔵アンテナ3から高感度の外部アンテナ7に切り換わる。なお、この際に送信系のアンテナ回路は、内蔵アンテナ3を使用する回路のままである。

【0021】この無線通信機を備えたバインド型手帳によれば、手帳1にバインドされた無線通信機2を、利用者がその手帳1を閉じた状態で持ち歩いても、結合プラグ8がアンテナジャック11に差し込まれていれば外部アンテナ7により受信が行なわれるので、内蔵アンテナ3を用いて受信する場合に比べて高感度な受信ができる。

【0022】図5はこの発明による携帯型無線通信装置である無線通信機を備えたバインド型手帳の他の実施の形態を示す図2と同様な回路図であり、図2と対応する部分には同一の符号を付してある。この無線通信機を備えたバインド型手帳は、図2で説明した実施の形態に対し、結合プラグ8（図1参照）とアンテナジャック11とからなるコネクタを受信回路12側でなく送信回路16側に配設するようにした点のみが異なる。

【0023】このようにすれば、前述した実施の形態と同様に無線通信機2'を手帳（図1の手帳1を参照）に合体させた状態で結合プラグ8をアンテナジャック11に差し込んでそれらを互いに嵌合させれば、図5に仮想線で示す位置から実線で示すようにアンテナジャック11内の接点cが接点bから切り離されて接点aに接触するので、送信系回路のアンテナが内蔵アンテナ3から外部アンテナ7に切り換わる。なお、この際に受信系のアンテナ回路は、内蔵アンテナ3を使用する回路のままである。

【0024】この無線通信機を備えたバインド型手帳によれば、手帳にバインドされた無線通信機2'を、利用者が手帳を閉じた状態で持ち歩いても、結合プラグ8がアンテナジャック11に差し込まれていれば外部アンテナ7により送信が行なわれるので、内蔵アンテナ3を用

いた場合に比べて空中に放出される空中線電力が増大するため、良好な相手局との通信性が得られる。

【0025】図6はこの発明による携帯型無線通信装置である無線通信機を備えたバインド型手帳の更に他の実施の形態を示す図2と同様な回路図であり、図2と対応する部分には同一の符号を付してある。この無線通信機を備えたバインド型手帳は、図2及び図5で説明した各実施の形態に対して、アンテナジャック11の配設位置を異ならせた点のみが異なる。

【0026】すなわち、アンテナジャック11を無線通信機2'の筐体4に設け、そのアンテナジャック11に結合プラグ8（図1）が嵌合するまでは図6に実線で示すようにアンテナジャック11内の接点cが接点bに接続され、アンテナジャック11に結合プラグ8を差し込んで互いに嵌合させると、同図に仮想線で示すように接点cが接点bから離れて接点aに接続されるようにしている。

【0027】したがって、プラグ8をアンテナジャック11に嵌合させるまでは、内蔵アンテナ3が通信回路10の送信回路16と受信回路12とに共に接続されたアンテナ共用器15に接続されているが、プラグ8をアンテナジャック11に差し込んでそれらを互いに嵌合させると、内蔵アンテナ3がアンテナ共用器15から切り離されて、そのアンテナ共用器15には外部アンテナ7が接続されるようになる。

【0028】そのため、手帳にバインドされた無線通信機2'を、利用者が手帳を閉じた状態で持ち歩いても、結合プラグ8がアンテナジャック11に差し込まれていれば外部アンテナ7により送信及び受信が行なわれるので、内蔵アンテナ3を用いた場合に比べて高感度な受信ができると共に、相手局とも良好な通信性が得られる。以上、この発明を無線通信機を備えたバインド型手帳に適用した各実施の形態について説明したが、この発明はそれ以外に可搬型（携帯型）情報通信機器や、可搬型電子機器等にも同様に適用することができる。

【0029】

【発明の効果】以上説明したように、この発明による携帯型無線通信装置は、無線通信機を手帳にバインドした状態で手軽に持ち運びすることができるので携帯性に優れており、コネクタの一方を他方に嵌合させて接続すれば、アンテナが内蔵アンテナから外部アンテナに切り換わるので、高い感度の通信性が得られる。

【図面の簡単な説明】

【図1】この発明による携帯型無線通信装置である無線通信機を備えたバインド型手帳を示す外観斜視図である。

【図2】同じくその無線通信機を備えたバインド型手帳の回路図である。

【図3】同じくその無線通信機に設けられている外部アンテナジャックとそこに差し込まれる外部アンテナ結合

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プラグを示す概略図である。

【図4】同じくその外部アンテナジャックに外部アンテナ結合プラグが差し込まれた状態を示す概略図である。

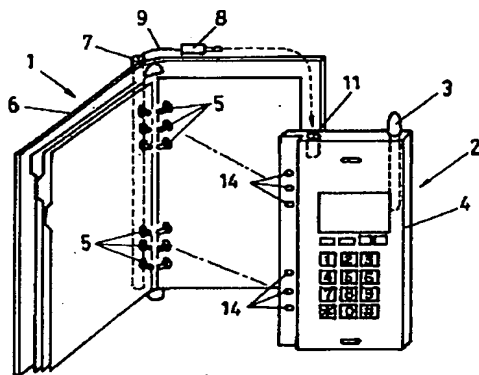
【図5】この発明による携帯型無線通信装置である無線通信機を備えたバインド型手帳の他の実施の形態を示す図2と同様な回路図である。

【図6】この発明による携帯型無線通信装置である無線通信機を備えたバインド型手帳の更に他の実施の形態を示す図2と同様な回路図である。

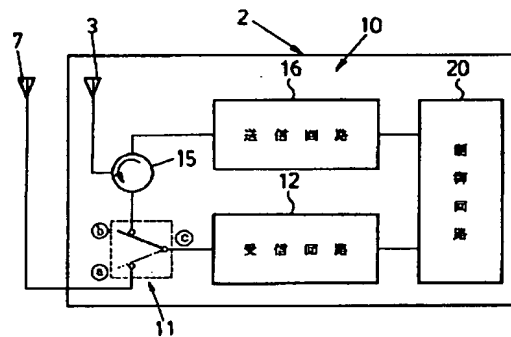
【符号の説明】

- * 1 : 手帳 2, 2', 2'' : 無線通信機
 3 : 内蔵アンテナ 4 : 筐体
 5 : バインド爪 (バインド部材) 7 : 外部アンテナ
 6 : カバー表面 8 : 外部アンテナ結合プラグ (コネクタ)
 10 : 通信回路
 11 : 外部アンテナジャック (コネクタ)
 12 : 受信回路
 14 : バインディング孔 (バインド部)
 * 10 15 : アンテナ共用器 16 : 送信回路

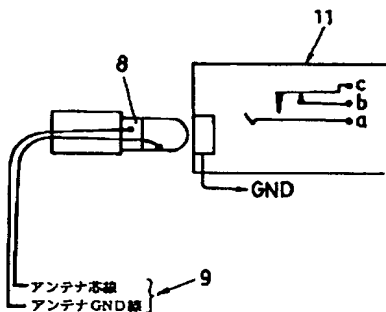
【図1】



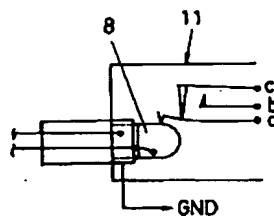
【図2】



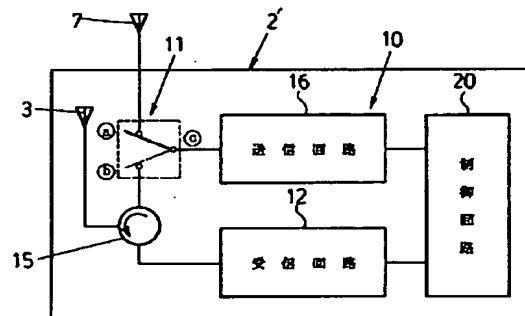
【図3】



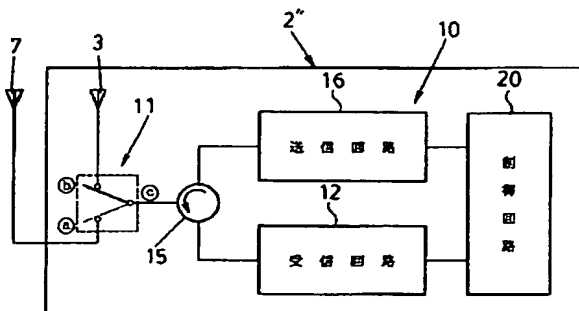
【図4】



【図5】



【図6】



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